

WHAT IS CLAIMED IS:

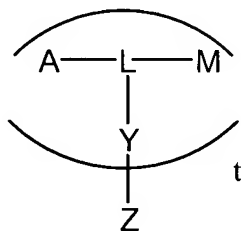
1. A compound comprising an amphetamine moiety and a methamphetamine moiety linked together by a first linking group wherein a second linking group depends  
 5 from said first linking group and the distance of the amphetamine moiety and the methamphetamine moiety from the point of linkage of said second linking group to said first linking group is approximately the same and wherein said second linking group terminates in a functional group.

10 2. A compound according to Claim 1 wherein a poly(amino acid) or a non-poly(amino acid) label moiety is linked to said second linking group by means of said functional group.

15 3. A compound according to Claim 1 wherein said distance is equal.

4. A compound according to Claim 1 wherein said amphetamine and said methamphetamine are stereospecific.

5. A compound of the formula:



20 wherein:

A is an amphetamine moiety,

M is a methamphetamine moiety,

L is a linking group,

25 Y is a bond, a functional group or a linking group and is bonded to L at a point equidistant between A and M, and

Z is a poly(amino acid), a non-poly(amino acid) label moiety or a functional group;

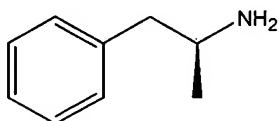
t is 1 when Z is a functional group or a non-poly(amino acid) label or Z is an integer between 1 and the molecular weight of a poly(amino acid) divided by about 500; and salts thereof.

5            6.        A compound according to Claim 5 wherein A and M are linked to L from the same position in A and M.

7.        A compound according to Claim 5 wherein Z is an enzyme.

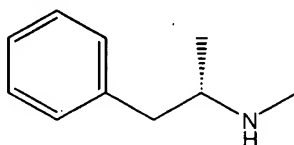
10           8.        A compound according to Claim 5 wherein said amphetamine moiety and said methamphetamine moiety are stereospecific.

9.        A compound according to Claim 5 wherein A is:

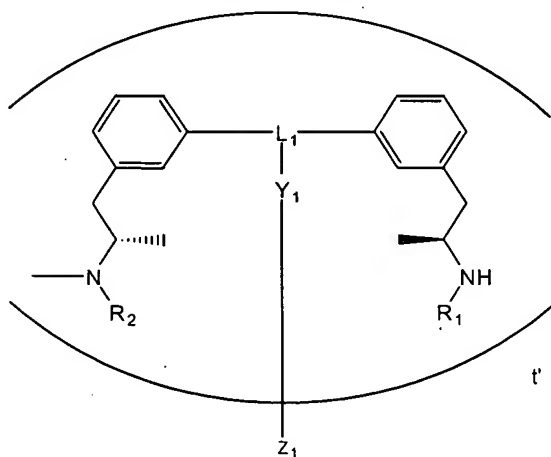


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10.       A compound according to Claim 5 wherein M is:



11.       A compound of the formula:



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wherein:

$R_1$  is hydrogen, lower alkyl or a protecting group,

$R_2$  is hydrogen, lower alkyl or a protecting group,

$L_1$  is a linking group,

5  $Y_1$  is a bond, a functional group or a linking group and is bonded to  $L_1$  at a point equidistant between the point of attachment to each of the phenyl groups,

$Z_1$  is a poly(amino acid), a non-poly(amino acid) label or a functional group; and

10  $t'$  is 1 when  $Z_1$  is a functional group or a non-poly(amino acid) label or  $Z_1$  is an integer between 1 and the molecular weight of a poly(amino acid) divided by about 500; and salts thereof.

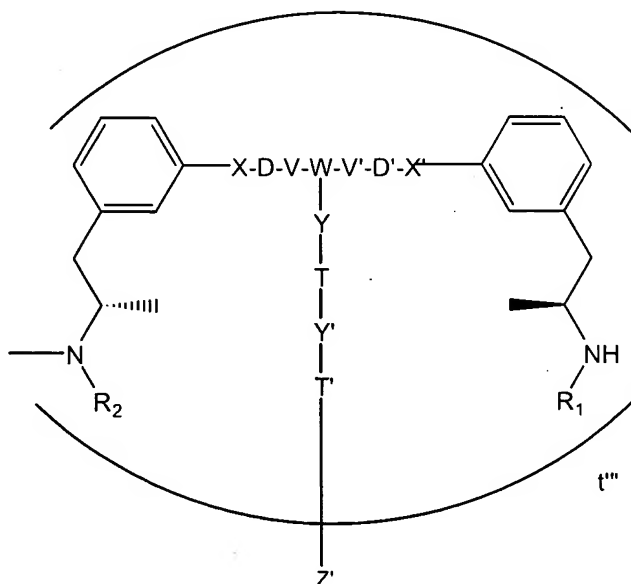
12. A compound according to Claim 11 wherein  $Z_1$  is an enzyme.

13. A compound according to Claim 11 wherein  $R_1$  is hydrogen.

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14. A compound according to Claim 11 wherein  $R_2$  is methyl.

15. A compound of the formula:



20 wherein:

$R_1$  and  $R_2$  are independently H or a protecting group,

X and X' are independently O, S, or a bond;

D and D' are independently alkylene or substituted alkylene;

V and V' are independently O, S, or a bond;

W is CH;

5 Y is NR<sub>3</sub> wherein R<sub>3</sub> is H or lower alkyl, O, S, or a bond;

T is alkylene, -(C=O)alkylene, ethereal alkylene, acetamide or a bond;

Y' is NR<sub>3</sub> wherein R<sub>3</sub> is H or lower alkyl, O, S, or a bond;

T' is alkylene, -(C=O)alkylene, ethereal alkylene, acetamide or a bond; and

10 Z' is a poly(amino acid), a non-poly(amino acid) label moiety, H, Br, Cl, F, I, NH<sub>2</sub>,  
acetamide, haloacetamide, or a bond;

t' is 1 when Z' is a functional group or a non-poly(amino acid) label or Z' is an integer between 1 and the molecular weight of a poly(amino acid) divided by about 500; with the proviso that X and X' have approximately the same length, D and D' have approximately the same length, and V and V' have approximately the same length;

15 and salts thereof.

16. A compound according to Claim 15 wherein Z' is an enzyme.

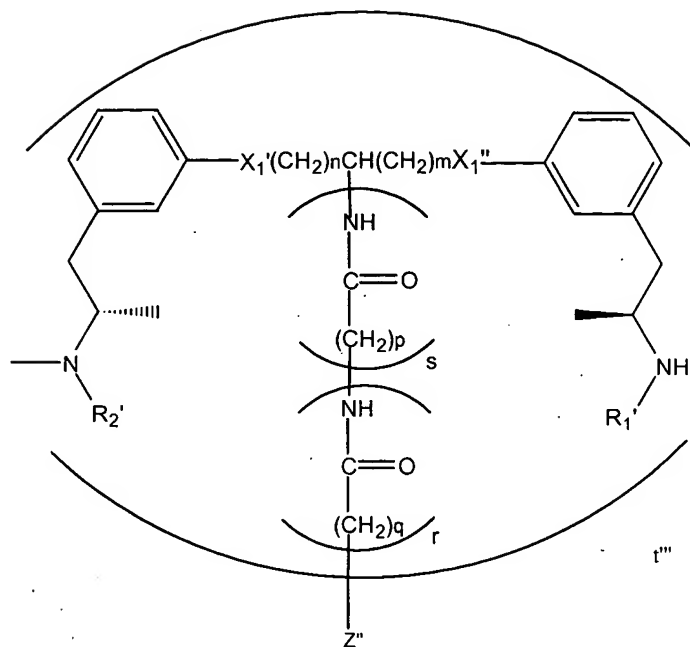
20 17. A compound according to Claim 15 wherein X and X' are S.

18. A compound according to Claim 15 wherein D and D' are methylene.

19. A compound according to Claim 15 wherein Y and Y' are NH.

25 20. A compound according to Claim 15 wherein T and T' are -(C=O)CH<sub>2</sub>-.

21. A compound of the formula:



wherein:

$R_1'$  and  $R_2'$  are independently H or a protecting group,

$X_1'$  and  $X_1''$  are S or O;

5  $Z''$  is an enzyme; H, Br, Cl, F, I,  $NH_2$ , acetamide, haloacetamide, or a bond;

$t'''$  is 1 when  $Z''$  is other than an enzyme and, when  $t'''$  is an enzyme,  $t'''$  is an integer between 1 and the molecular weight of said enzyme divided by about 500; and

$n$ ,  $m$ ,  $p$ ,  $q$ ,  $r$  and  $s$  are each independently 1 to 5;

and salts thereof.

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22. A compound according to Claim 21 wherein  $R_1$  and  $R_2$  are H,

$X_1'$  and  $X_1''$  are S,  $n$ ,  $m$ ,  $p$ ,  $q$ ,  $r$  and  $s$  are 1, and  $Z''$  is an enzyme.

23. A compound according to Claim 21 wherein  $R_1$  and  $R_2$  are H or a protecting

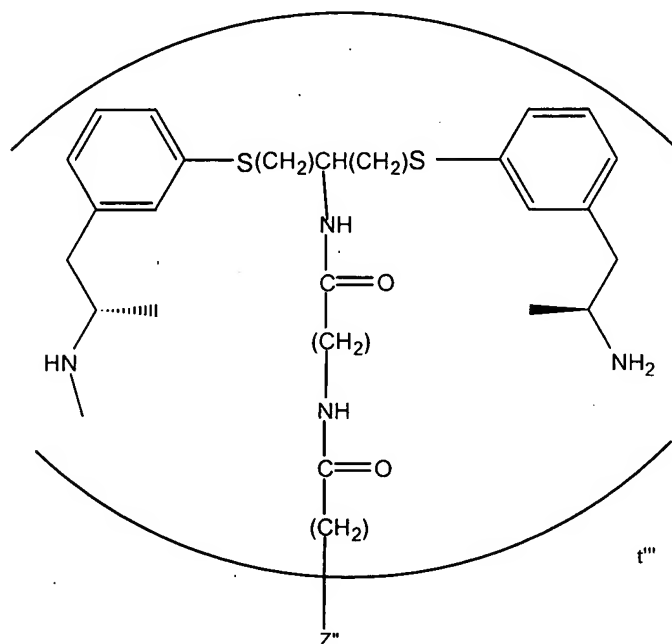
15 group,  $X_1'$  and  $X_1''$  are S,  $n$  and  $m$  are 1,  $r$  and  $s$  are 0, and  $Z''$  is  $NH_2$ .

24. A compound according to Claim 21 wherein  $R_1$  and  $R_2$  are H or a protecting

group,  $X_1'$  and  $X_1''$  are S,  $n$  and  $m$  are 1,  $r$  is 1 and  $s$  is 0, and  $Z''$  is Br.

25. A compound according to Claim 21 wherein  $R_1$  and  $R_2$  are H or a protecting group,  $X_1'$  and  $X_1''$  are S, n and m are 1, r and s are 1, and  $Z''$  is Br.

26. A compound of the formula:



wherein:

$Z''$  is an enzyme; and

$t'''$  is an integer between 1 and the molecular weight of said enzyme divided by about 500.

27. A compound according to Claim 26 wherein said enzyme is glucose-6-phosphate dehydrogenase.

28. A reagent system comprising a compound according to Claim 26, an antibody for amphetamine and an antibody for methamphetamine.

29. A method for determining amphetamine and/or methamphetamine in a sample suspected of containing amphetamine and/or methamphetamine, said method comprising:

(a) providing in combination in a medium:

- (i) said sample and
- (ii) a reagent system according to Claim 28; and

(b) examining said medium for the presence of a complex comprising said compound and said antibody for amphetamine and/or a complex of said compound and said antibody for methamphetamine, the presence thereof indicating the presence of said amphetamine and/or methamphetamine in said sample.

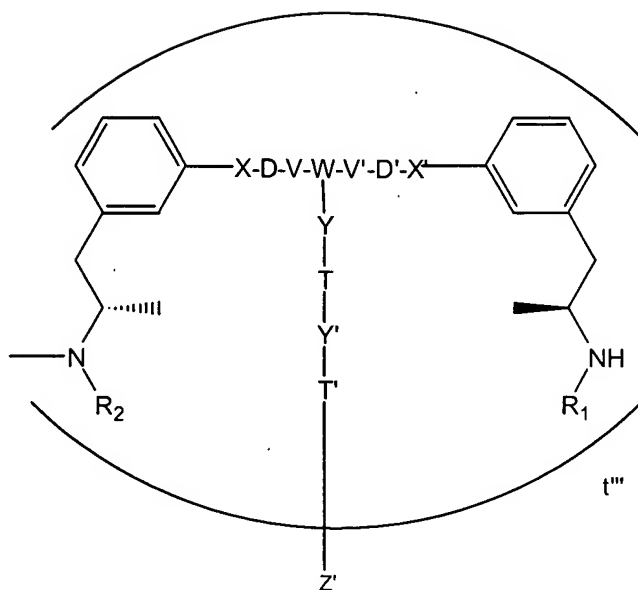
30. A method according to Claim 29 wherein said examining comprises measuring signal from said enzyme, the amount thereof being related to the presence of said amphetamine and/or methamphetamine in said sample.

31. A method according to Claim 30 wherein said method is a homogeneous method and said medium is examined for the amount of said signal.

32. A method according to Claim 30 wherein said method is a heterogeneous method and said complex, if present, is separated from said medium and said medium or said complex is examined for the amount of said signal.

33. A method for determining amphetamine and/or methamphetamine in a sample suspected of containing amphetamine and/or methamphetamine, said method comprising:

- (a) providing in combination in a medium:
  - (i) said sample,
  - (ii) an antibody for amphetamine,
  - (iii) an antibody for methamphetamine,
  - (iv) a compound of the formula:



wherein:

- $R_1$  and  $R_2$  are H,
- $X$  and  $X'$  are independently O, S, or a bond;
- 5  $D$  and  $D'$  are independently alkylene or substituted alkylene;
- $V$  and  $V'$  are independently O, S, or a bond;
- $W$  is CH;
- $Y$  is O, S, a bond, or  $NR_3$  wherein  $R_3$  is H or lower alkyl;
- $T$  is alkylene,  $-(C=O)$ alkylene, , ethereal alkylene, acetamide or a bond;
- 10  $Y'$  is O, S, a bond, or  $NR_3$  wherein  $R_3$  is H or lower alkyl;
- $T'$  is alkylene,  $-(C=O)$ alkylene, ethereal alkylene, acetamide or a bond; and
- $Z'$  is an enzyme;
- $t'''$  is an integer between 1 and the molecular weight of said enzyme divided by about 500;
- 15 with the proviso that  $X$  and  $X'$  have approximately the same length,  $D$  and  $D'$  have approximately the same length, and  $V$  and  $V'$  have approximately the same length; and
- (b) examining said medium for the presence of a complex comprising said compound and said antibody for amphetamine and/or a complex of said compound and said antibody for methamphetamine, the presence thereof indicating the presence of said
- 20 amphetamine and/or methamphetamine in said sample.



34. A method according to Claim 33 wherein said examining comprises measuring signal from said enzyme, the amount thereof being related to the presence of said amphetamine and/or methamphetamine in said sample.

5 35. A method according to Claim 34 wherein said method is a homogeneous method and said medium is examined for the amount of said signal.

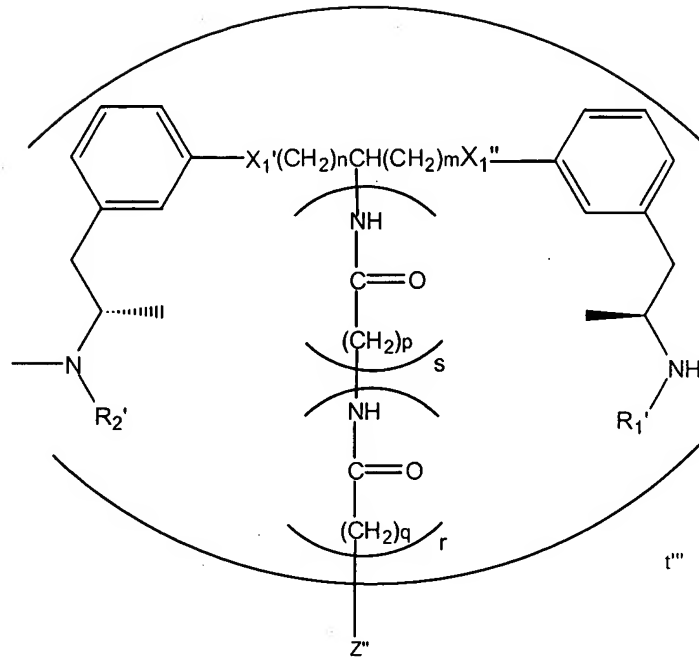
36. A method according to Claim 34 wherein said method is a heterogeneous method and said complex, if present, is separated from said medium and said medium or  
10 said complex is examined for the amount of said signal.

37. A method according to Claim 33 wherein said enzyme is glucose-6-phosphate dehydrogenase.

15 38. A method for determining amphetamine and/or methamphetamine in a sample suspected of containing amphetamine and/or methamphetamine, said method comprising:

- (a) providing in combination in a medium:
  - (i) said sample,
  - (ii) an antibody for amphetamine,
  - (iii) an antibody for methamphetamine,
  - (iv) a compound of the formula:

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wherein:

$R_1'$  and  $R_2'$  are H,

$X_1'$  and  $X_1''$  are S or O;

5  $Z''$  is an enzyme;

$t'''$  is an integer between 1 and the molecular weight of said enzyme divided by about 500; and

$n, m, p, q, r$  and  $s$  are each independently 1 to 5; and

(b) examining said medium for the presence of a complex comprising said  
 10 compound and said antibody for amphetamine and/or a complex of said compound and said  
 antibody for methamphetamine, the presence thereof indicating the presence of said  
 amphetamine and/or methamphetamine in said sample.

39. A method according to Claim 38 wherein said examining comprises  
 15 measuring signal from said enzyme, the amount thereof being related to the presence of said  
 amphetamine and/or methamphetamine in said sample.

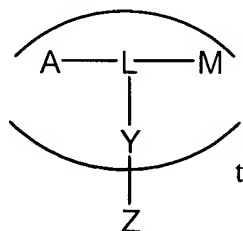
40. A method according to Claim 39 wherein said method is a homogeneous  
 method and said medium is examined for the amount of said signal.

41. A method according to Claim 39 wherein said method is a heterogeneous method and said complex, if present, is separated from said medium and said medium or said complex is examined for the amount of said signal.

42. A method according to Claim 38 wherein said enzyme is glucose-6-phosphate dehydrogenase.

43. A kit comprising in packaged combination:

- (i) an antibody for amphetamine,
- (ii) an antibody for methamphetamine,
- (iii) a compound of the formula:



wherein:

A is an amphetamine moiety,

M is a methamphetamine moiety,

L is a linking group,

Y is a bond a linking group and is bonded to L at a point equidistant between A and M,

Z is an enzyme,

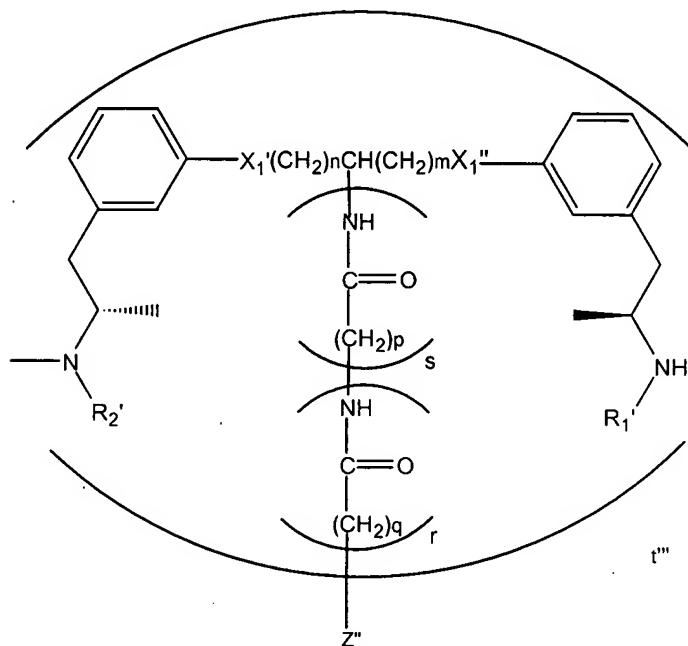
t is an integer between 1 and the molecular weight of said enzyme divided by about 500.

44 A kit according to Claim 43 wherein A and M are linked to L from the same position in A and M.

45 A kit according to Claim 43 wherein said amphetamine and said methamphetamine are stereospecific.

46. A kit according to Claim 43 wherein said enzyme is glucose-6-phosphate dehydrogenase.

47. A kit according to Claim 43 wherein said compound has the formula:



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wherein:

$R_1'$  and  $R_2'$  are H,

$X_1'$  and  $X_1''$  are S or O;

$Z''$  is an enzyme;

10  $t'''$  is an integer between 1 and the molecular weight of said enzyme divided by about 500; and

$n$ ,  $m$ ,  $p$ ,  $q$ ,  $r$  and  $s$  are each independently 1 to 5.

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